

UPDATED GROUNDWATER USE AND VALUE DETERMINATION

NYANZA CHEMICAL WASTE DUMP SUPERFUND SITE

ASHLAND, MASSACHUSETTS

February 2019

INTRODUCTION

Consistent with the U.S. Environmental Protection Agency's (EPA's) 1996 Final Groundwater Use and Value Determination Guidance, the Massachusetts Department of Environmental Protection (MassDEP) developed a Groundwater Use and Value Determination of groundwater impacted by the Nyanza Chemical Waste Dump Superfund Site in Ashland, MA (the Site) in 2014. At the request of EPA, MassDEP re-evaluated the findings presented in the 2014 Determination. This Revised Groundwater Use and Value Determination reflects updated findings based on the re-evaluation.

The purpose of a Groundwater Use and Value Determination is to identify whether groundwater is of "High", "Medium" or "Low" use and value. In the development of this Revised Groundwater Use and Value Determination, MassDEP applied the groundwater classification criteria promulgated in the Massachusetts Contingency Plan (MCP), which are similar to those presented in the Use and Value Determination Guidance established in a Memorandum of Agreement (MOA) between EPA and MassDEP, dated March 23, 1998.

The classification of groundwater is location specific and certain areas meet high, medium or low use and value for the reasons detailed below. A brief background of the Site, an explanation for the Updated Groundwater Use and Value Determination, a table listing the criteria facilitating the decision, and figures are provided below.

BACKGROUND INFORMATION

The Nyanza Chemical Waste Dump Superfund Site is located in the Sudbury Watershed, consisting of large tracks of wetlands, streams, and rivers and impounded waterways. The landfill cap is approximately 14 acres in area, though the entire Site including the groundwater contaminant plume extends approximately 3000 feet to the north and northeast. The landfill is situated in the southwestern portion of the Site.

To the north of the landfill are railroad tracks and Pleasant Street. Land use north of Pleasant Street is primarily medium-high density residential, and land use south of Pleasant Street is a mix of industrial, commercial and residential. The remaining areas adjacent to the site are wooded with intermittent

wetlands. A new apartment complex (Cirrus Apartments) is also located west of the Site on the west side of the MBTA access road.

The extent of the Review Area was defined based on groundwater flow and contaminant flow pathways. Analysis of the large amount of hydrogeological and chemical data collected over the past 30 years indicates that the contaminant plume is stable both horizontally and vertically. Figure 1 identifies the Review Area (orange line) and also the maximum extent of the groundwater plume exceeding MCP Groundwater 1 Reportable Concentrations (yellow line).

Soils in the review area have been classified as silty fine sand and sandy silt (glaciolacustrine sediments) near the cap area, and as gravel and cobbles near Pleasant Street (glaciofluvial sediment), with a thickness ranging from 3.5 feet to 11.5 feet in the northern parts of the review area.

Bedrock surface is at an elevation of 350 feet mean sea level (msl) at Megunko Hill and slopes downward toward the north to an elevation of 180 feet msl. There is a meandering bedrock trough near the railroad tracks and Pleasant Street. The direction of the trough is generally in a west to east direction and is thought to be a pre-glacial river valley. Bedrock is generally competent at depths greater than 15 feet. The top 15 feet of bedrock is slightly to highly fractured, with near vertical fractures oriented N60E to N60W.

Horizontal groundwater flow in both the unconsolidated and consolidated aquifer is generally from the south to the north and northeast, before discharging into the Sudbury River. Vertical gradients trend downward overall with eventual upward discharge into the Sudbury River. Depth to groundwater ranges from 20 to 30 feet below ground surface at Megunko Hill to ground surface at the Sudbury River. Hydraulic conductivity ranges from 5×10^{-5} to 1×10^{-3} in the unconsolidated aquifer, and from no flow to 2×10^{-3} in bedrock depending upon depth.

A Potentially Productive Aquifer (PPA) is located within the Review Area as reflected by green and gray shaded areas on Figure 1. The Massachusetts Contingency Plan defines a Potentially Productive Aquifer as an aquifer delineated by the United States Geological Survey as high or medium yield aquifer. The PPA is elongated and generally extends from west to east along the northern side of the railroad tracks until the center of town, where it re-oriens in a southeasterly direction.

Although Potentially Productive Aquifers are capable of providing significant yields of groundwater, certain land uses and development patterns are inconsistent with groundwater use for drinking water purposes. In accordance with the Massachusetts Contingency Plan, such portions of PPAs are classified as Non Potential Drinking Water Source Areas (NPDWSA). Land uses considered inconsistent with the use of groundwater as potable water are industrial, commercial, multi-family housing and single family housing on small, dense lots (less than $\frac{1}{4}$ acre in size). Also designated urbanized areas or areas with a population density greater than 4,400 people per square mile based on the 1990 census block designation are considered for the NPDWSAs.

Portions of the Potentially Productive Aquifer that meet the MCP definition of NPDWSA are represented by gray shading on Figure 1. Remaining portions of the PPA, which are still considered potential groundwater source areas, are represented by light green shading.

According to MassGIS data and information provided by the Town of Ashland, there are no municipal water sources located within the Review Area. Municipal water for the Town of Ashland is sourced from groundwater at the Hopkinton Reservoir approximately 2 miles west of the Review Area.

Information available through the MassDEP well drillers' certification program indicates that no domestic wells were installed within the Review Area. Similarly, the Town of Ashland Board of Health did not identify any private potable water wells within the Review Area. The nearest private wells are located on Indian Brook Road and Dale Road, over 4000 feet west of the Review Area, and cross-gradient to the groundwater contaminant plume. Previous investigations conducted in 2003 and 2014 also indicated that no private wells were installed within the Review Area.

Groundwater is a critical component to both the health and sustainability of the water resource areas within the Review Area. The Review Area contains significant wetland resource areas east, north, and west of the site landfill cap. Both the wetland areas and the Sudbury River receive a significant component of flow from groundwater and are groundwater discharge areas.

There are no known state endangered or species of special concern within the Review Area.

DETERMINATION

A number of considerations are used to determine the use and value of the Review Area groundwater including the groundwater classification system in the Massachusetts Contingency Plan (310 CMR 40.0932).

All groundwater within the Commonwealth is classified as GW-3, which considers the ecological and human health impacts and risks associated with the discharge of groundwater to surface water. Overall the aquifer has significant current ecological value for its contribution to adjacent wetlands and river systems.

In addition, groundwater currently used, or with the potential to be used for potable water supplies is classified as GW-1. Groundwater is classified as GW-1 if it is located as follows:

1. Within a current drinking water source area, which includes groundwater located:
 - a. Within a Zone II for a public water supply,
 - b. Within an interim well head protection area for a public water supply,
 - c. Within a Zone A or a Class A surface water body used as a public water supply, or
 - d. Within 500 feet of a private well.
2. Within a potential drinking water source area, which includes groundwater that is located:
 - a. 500 feet or more from a public water supply distribution pipeline,

- b. Within an area designated by a municipality specifically for the protection of groundwater to ensure its availability as a source of potable water.
- c. Within a Potentially Productive Aquifer.

Groundwater within the Review Area is not currently within a drinking water source area. There are no known current public or private drinking water supplies, Zone II or interim wellhead protection areas, or Zone A protection areas within the Review Area.

Regarding the potential for future water supply uses of groundwater, a review of property maps available at the Ashland Assessors Office and the Southern Middlesex Registry of Deeds indicates that at least portions of all properties within the Review Area are within 500 feet of a public water distribution line and would therefore have access to public water.

The groundwater within the Review Area is not designated as a groundwater protection district or otherwise specifically protected by the Town of Ashland for the purposes of future potable water.

A Potentially Productive Aquifer (PPA) is located within the Review Area. A small portion of that aquifer is classified as a potential drinking water source area (Figure 1, light green shaded areas). This is the portion defined as a PPA but not otherwise excluded as a non-drinking water source area (*gray shaded areas*).

The 2014 Groundwater Use and Value Determination identified the entire portion of the PPA north of Pleasant Street as a potential drinking water source area. Subsequently, MassDEP further evaluated the land uses north of Pleasant Street and determined that current land uses within the eastern portion of this area meet the MCP definition for a non-drinking water source area and should be reclassified as such. This NPDWSA extends eastward from 42°15' 43"N, -71°28'27.7"W to the intersection with Main Street (Figure 1, *dark green shaded area*).

Based on the considerations discussed above, MassDEP assigns the groundwater in the Review Area as of medium use and value. A portion of the PPA located within the Review Area is considered a potential water source area under the MCP and should be evaluated as such in any future evaluation s of risk. This potential source water area is located north of Pleasant Street and extends for about 880 feet from 42°15' 43"N, -71°28'38.4"W (western end) to from 42°15' 43"N, -71°28'27.7"W (eastern end).

Groundwater beneath the remainder of the site, while not considered as potential sources of water supply, is considered important for ecological purposes. Evaluations of risk in these areas should include ecological impacts.

Table 1 provides the use and value for all the factors considered in determining the use and value of groundwater within the Review Area.

Table 1

Groundwater Use and Value Considerations				
Factors	High	Medium	Low	Comments
1. Quantity		X	x	There is a PPA within the Review Area which may provide suitable quantity of groundwater for potable use and groundwater is classified at medium use and value. Groundwater elsewhere is classified as low use and value.
2. Quality		X		In the absence of site related contaminants, data from historic water analysis indicate that water may be suitable for potable uses with treatments.
3. Current Public Water Supply Source			X	There are no known public or non-community potable water supply sources within the Review Area.
4. Current Private Water Supply Source			X	There are no known private potable water supply sources in the Review Area.
5. Likelihood of a Future Drinking Water Source (within the PPA lands)		x	X	An area has been identified that meets the MCP definition of a potential drinking water source area and is valued at medium use and value. Other areas of the aquifer are not considered a potential drinking water source area and are considered low use and value.
6. Other Current or Reasonable Expected Groundwater Uses in Review Area		X		Groundwater is or has the potential to be used for irrigation.
7. Ecological Value	X			Groundwater in the study area discharges to significant wetland resource area.
8. Public Opinion			X	Public would not likely consider the groundwater within the review area to be a desirable potential drinking water source.

Figure 1

